Name:

at1124exam: Radicals and Squares (v930)

Question 1

Simplify the radical expressions.

$\sqrt{50}$	$\sqrt{8}$	$\sqrt{28}$
$\sqrt{5 \cdot 5 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 7}$
$5\sqrt{2}$	$2\sqrt{2}$	$2\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+7)^2}{5} + 2 \;=\; 7$$

First, subtract 2 from both sides.

$$\frac{(x+7)^2}{5} = 5$$

Then, multiply both sides by 5.

$$(x+7)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 7 = \pm 5$$

Subtract 7 from both sides.

$$x = -7 \pm 5$$

So the two solutions are $x = -2$ and $x = -12$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 16x = 57$$

$$x^2 - 16x + 64 = 57 + 64$$
$$x^2 - 16x + 64 = 121$$
$$(x - 8)^2 = 121$$
$$x - 8 = \pm 11$$
$$x = 8 \pm 11$$
$$x = 19 \quad \text{or} \quad x = -3$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 + 16x + 37$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 8x) + 37$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 8x + 16 - 16) + 37$$

Factor the perfect-square trinomial.

$$y = 2((x + 4)^2 - 16) + 37$$

Distribute the 2.

$$y = 2(x + 4)^2 - 32 + 37$$

Combine the constants to get **vertex form**:

$$y = 2(x + 4)^2 + 5$$

The vertex is at point $(-4, 5)$.